

SKADDEN, ARPS, SLATE, MEAGHER & F

1440 NEW YORK AVENUE, N.W.

WASHINGTON, D.C. 20005-2107

(202) 371-7000

FAX (202) 393-5760

DIRECT DIAL
(202) 371-

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June 9, 1992

BY HAND DELIVERY

Ms. Donna R. Searcy, Secretary
Federal Communications Commission
Washington, D.C. 20554

Re: In the Matter of Redevelopment of Spectrum
to Encourage Innovation in the Use of New
Telecommunications Technologies,
ET Docket No. 92-9

Dear Ms. Searcy:

OCOM Corporation, by its counsel, filed Comments yesterday, June 8, 1992, in the above referenced rulemaking proceeding. After filing, counsel discovered that the signature page had inadvertently not been executed. To rectify the omission please find attached an original and four copies of those same Comments, as well as the cover page of a FCC date-stamped copy of the Comments to verify timeliness of filing.

Respectfully submitted,

Simone Wu

Simone Wu
(Admitted to practice
in Illinois only)

Attachment

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Before the
Federal Communications Commission
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In the Matter of)

Redevelopment of Spectrum to)
Encourage Innovation in the)
Use of New Telecommunications)
Technologies)

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

ET Docket No. 92-9

COMMENTS OF OCOM CORPORATION

Thomas J. Casey
Jay L. Birnbaum
Simone Wu

Skadden, Arps, Slate,
Meagher & Flom
1440 New York Avenue, N.W.
Washington, D.C. 20005
(202) 371-7000

Attorneys for OCOM
Corporation

Dated: June 8, 1992

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Summary

OCOM Corporation ("OCOM"), a provider of private-line telecommunications services and a currently licensed microwave operator in the 2 GHz band, strongly supports the goal of making spectrum available for the use of emerging technologies. OCOM may, in fact, eventually apply for such licenses. In allocating such spectrum, however, the Commission should not facilitate the degradation of existing common carrier and private microwave service by reallocating the 2 GHz frequencies without fully considering other alternatives or the ramifications for incumbent 2 GHz licensees and the proposed new 2 GHz licensees.

For example, the current 2 GHz reallocation proposal would force incumbent 2 GHz licensees to move their operations to higher frequencies, including frequencies above 10 GHz. OCOM's experience demonstrates that microwave service can be severely hampered by service outages associated with rain attenuation at frequencies above 8 GHz. Even with costly reengineering rain attenuation cannot be fully eliminated. Similarly, other microwave frequencies pose coordination and availability problems and have not been allocated for the narrow-band communications found at 2 GHz. Other types of transmis-

sion media, such as fiber, are far too costly to implement, too inefficient for such purposes, and more difficult and costly to maintain.

Accordingly, the Commission should examine the possibility of using underutilized government spectrum, which is currently under discussion in Congress and within the Bush Administration, and should not lightly dismiss such an alternative. The Commission should also consider allocating to new technologies the available frequencies to which it is now proposing to have incumbent 2 GHz users move. Finally, recent studies indicate that continued long-term sharing of the 2 GHz frequencies between existing licensees and new technology licensees may be possible.

If the Commission ultimately determines to reallocate existing microwave spectrum, it should adopt rules and procedures to protect the interests of incumbent licensees and the integrity of their services. Thus, the Commission should ensure that good faith negotiations are conducted for compensation of existing licensees' relocation costs. Current 2 GHz licensees should also be eligible for tax certificates for payments from new licensees to facilitate relocation.

In the Matter of
Redevelopment of Spectrum to
Encourage Innovation in the
Use of New Telecommunications
Technologies

ET Docket No. 92-9

OCOM Corporation ("OCOM"), by its attorneys, hereby submits these comments in response to the Notice of Proposed Rulemaking ("NPRM") issued by the Federal Communications Commission ("Commission") in the above-captioned proceeding.¹

OCOM, a provider of private-line telecommunications services, is presently licensed to operate over 140 common carrier microwave stations primarily in the state of Ohio. Approximately two-thirds of these stations

1 Redevelopment of Spectrum to Encourage Innovation in
the Use of New Telecommunications Technologies, ET
Docket No. 92-9, Notice of Proposed Rule Making
(rel. Feb. 7, 1992).

operate on frequencies in the 2 GHz range that the Commission proposes to reallocate. Other licensees in this band are telephone companies; cellular telephone and paging services providers; public gas, electric and water utilities; and railroads and other transportation companies.

OCOM strongly supports the goal of making spectrum available for the use of emerging technologies. Indeed, OCOM may eventually apply for these licenses. Nonetheless, the Commission should not seek to achieve what are only potential benefits of the proposed technologies at the high cost of serious degradation of current essential services. This is particularly true where such this action would be taken without fully considering all of the alternatives. These alternatives currently include allocating new technologies on a shared basis with existing licensees in the 2 GHz band or allocating new technologies to other frequencies such as those above 3 GHz or those currently reserved for, but underutilized by, the government. The public interest would not be served by arbitrarily uprooting established, reliable communications services in favor of undefined and untried technologies when other alternatives exist that could equally accommodate the Commission's spectrum needs.

As demonstrated below, OCOM submits that the NPRM does not accurately reflect the real-life complications for existing microwave licensees that would be associated with the Commission's proposals. If, however, the Commission ultimately deems it necessary to reallocate the existing microwave spectrum, it should establish rules and procedures to protect the interests of existing licensees and the integrity of the services they provide.

I. The Proposed 2 GHz Band Reallocation Would Disrupt and Degrade the Quality and Reliability of OCOM's Services.

The Commission has proposed to require that current users of the 2 GHz Band move their operations to higher frequencies. Specifically, the Commission proposes to encourage licensees with paths of less than 10 miles to move their operations to frequencies of 10 GHz and higher, thereby enabling licensees with longer paths to move their operations to the 4 GHz or 6 GHz bands. OCOM's experience demonstrates, however, that microwave service can be severely hampered by service outages associated with rain attenuation at frequencies above 8 GHz, even over distances of less than 10 miles. Because the majority of OCOM's microwave paths at the 2 GHz range are less than 10 miles in length, this frequency change would have a significant adverse impact on the quality and

reliability of service OCOM can provide to the public. Further, even relocating its longer paths to 4 GHz or 6 GHz would present costly complications.

A. Moving Incumbent Users of the 2 GHz Band to the Higher Frequency Bands Will Result in Rain Attenuation Outages and Other Problems.

OCOM operates some paths at 10 GHz and above, primarily because of congestion at the preferable 2 GHz band in some areas. Based on this experience, OCOM has documented the problems of operating microwave stations at higher frequencies.

For example, in order to reduce rain attenuation problems -- otherwise known as "rain fade" -- at higher frequencies, OCOM recently had to incur costs of approximately \$3 million to upgrade its microwave network connecting customer points in the cities of Columbus, Dayton and Cincinnati. In this instance, one 7.75 mile (12.5 km) 11 GHz 2 DS-3 (high capacity) radio link had been experiencing rain fade during the Spring and Summer months for two years, resulting in multiple circuit outages. Frequency interference problems precluded use of more reliable 4 GHz and 6 GHz radios along this path. Thus, it was necessary to engineer five new radio paths

operating with 6 GHz radios to replace the one path operating at 11 GHz.²

Similarly, in the Cleveland area, a 3.72 mile (6 km) path engineered to operate in the 18 GHz band has experienced thunder storm-induced outages ranging from 3 to 5 minutes in length. Such rain fade is common at higher frequencies, and it is particularly troublesome for certain paths carrying critical traffic loads.³

In addition to rain fade problems at frequencies above 8 GHz, frequency coordination in the 4 GHz and 6 GHz bands is time-consuming, costly and difficult to accomplish due to extensive interference problems. These two bands are already very crowded and would not likely be able to support the extensive spectrum demands that

² Frequencies in the 10 GHz and 11 GHz bands have similar rain attenuation characteristics, as do frequencies in the 18 GHz and 23 GHz bands.

³ The Commission has recognized that telephone companies provide services to remote areas using the 2 GHz band, cellular companies rely on these frequencies to interconnect cell sites with mobile telephone switching offices, and paging companies use them to connect paging stations with control and repeater stations. In addition, utilities and transportation companies utilize 2 GHz band facilities for vital safety and reliability communications. NPRM at ¶ 15. OCOM currently provides private line services for some of these types of entities, such as paging and cellular carriers.

would arise if 2 GHz microwave licensees were forced to emigrate there, let alone forced to design their future microwave needs using these bands.⁴ Moreover, use of narrowband systems (such as those now licensed on 2 GHz) on 4 GHz and 6 GHz frequencies would constitute an inefficient use of the spectrum because these bands are designed for wideband operations.⁵ Interweaving narrowband channels into this spectrum would severely decrease overall spectrum efficiency.⁶

Finally, the fact that the 4 GHz and 6 GHz bands are already shared with satellite earth station licensees also complicates the frequency coordination

⁴ This coordination would be further exacerbated if the Commission opens these common carrier bands to private users as proposed by the Utilities Telecommunications Council. See Amendment of Parts 2, 21 and 94 of the Commission's Rules to Accommodate Private Microwave Systems in the 1.71-1.85 GHz Band and in Bands Above 3 GHz, RM-7981, Petition for Rule Making (filed Mar. 31, 1992); Public Notice Mimeo No. 22934 (May 1, 1992).

⁵ The NPRM specifically states that the "technical rules and coordination procedures currently applicable to each of the higher frequency bands . . . will apply." NPRM at ¶ 20.

⁶ For example, 6 GHz operations utilize 30 MHz wide channels, which is almost 10 times the bandwidth currently used for operations in 2 GHz. For this reason, 6 GHz microwave operations usually entail very high capacity transmitters.

process. For instance, if relocation were required, many cellular and paging carriers would seek to relocate their microwave operations to 4 GHz or 6 GHz. The location of these carriers' microwave stations are dictated significantly by the design of their cellular or paging systems, which in turn are based upon radio propagation and frequency re-use characteristics. Since most cellular sites are located in metropolitan areas where the most utilized 4 GHz and 6 GHz frequencies are encountered, it would be extremely difficult to coordinate successfully reallocated microwave operations in these bands. This can leave such carriers, or companies such as OCOM that provide private line transmission services to such carriers, without any adequate substitute for their existing 2 GHz operations.⁷ Even if frequencies are located, the necessity to resolve some of the more complicated satellite earth station coordination problems can add thousands of dollars to the cost of coordination.

B. Reengineering Cannot Fully Alleviate These Problems.

Even costly and time-consuming reengineering cannot completely alleviate the outages associated with

⁷ As discussed below, alternative transmission means such as fiber will not always be efficient or viable. See infra pp. 11-14.

rain fade at frequencies above 8 GHz. Since rain fade is affected by path length, a carrier can attempt to minimize rain-induced outages by shortening the distances between communicating microwave stations. Even when such precautions are taken, however, outages will occur during heavy thunderstorms when intense thundercells and rain rates exceeding 100 mm/hr. intercept the microwave path. These outages generally last from one to 15 minutes; their duration varies in direct correlation to the size and speed of the thundercells, rainfall rate, and the direction in which the thundercell crosses the path line.

Further, as illustrated above, in order to shorten the distance between two points of communications, expensive intermediate microwave repeater stations must be built. Not only is this costly, but there is no guarantee that appropriate sites for construction are available in all locations. For instance, property must be available at a reasonable price; favorable zoning must be obtainable; tower heights must be reasonable and cost effective; frequencies (existing and growth) must be available; system reliability must be acceptable; and equipment must be available to meet the customers' requirements and frequency availability limitations. In short, a typical system implementation schedule for one

microwave station can vary from three to six months or longer with costs in the range of \$200,000-\$500,000.

Thus, external and technical factors other than cost play a vital role in the feasibility of reengineering facilities to minimize rain attenuation problems and to maximize operational efficiency at frequencies above 8 GHz. These factors will not only complicate any initial relocation from 2 GHz, but they will hamper future network growth for carriers such as OCOM and thereby diminish the range and quality of services available to OCOM's customers.

C. Alternative Transmission Means Generally Are Not Suitable Substitutes.

The NPRM also suggests that incumbent 2 GHz licensees could use alternative transmission technologies, namely fiber optics, if their spectrum is reallocated to emerging technologies. NPRM at n.17. While such alternatives may be possible in some cases, generally they are not feasible replacements for microwave stations, particularly for smaller companies such as OCOM.

First, fiber can be easily damaged or cut anywhere along the transmission path and may necessitate the added costs of obtaining rights of way, easements, and pole space rights, among other property rights, at various points along the transmission path. On the other

hand, microwave station facilities are much easier to secure and maintain since the communications traverse by air the distance over which fiber would have to be laid. For the same reason, damage to a microwave path is significantly easier to identify and repair than damage to fiber. In short, switching to fiber would reduce the reliability of OCOM's services.⁸

Second, fiber is significantly more expensive than microwave. For this reason, microwave facilities are more suitable than fiber in low-density, rural areas. Fiber often does not exist in such areas because it is not economical to use such expensive facilities in low-usage, low-density areas.⁹ In addition, because a long lead time is necessary to construct a fiber network, fiber is not conducive to rapid system modifications

⁸ Other enclosed transmission methods, such as cable, does not afford sufficient or efficient digital capacity and has the same property right limitations as fiber.

⁹ In rural areas, fiber optics can cost as much as \$50,000 per mile, according to OCOM's investigations. Moreover, if fiber were substituted for existing microwave paths, path lengths may need to be extended because of terrain or other reasons requiring the fiber to travel circuitous routes between two points, rather than "line of site" as with microwave paths. This would further increase the cost of using fiber.

necessary to meet customer demand for new site-to-site transmissions. Thus, even if new licensees were to pay the costs for microwave users initial relocation to fiber, the displaced carriers would lack the flexibility, reliability and maintenance benefits microwave offers over fiber.¹⁰ In short, because of the expense associated with the use of fiber, fiber is cost effective only for long-haul applications, whereas microwave links used by OCOM and other Part 21 licensees are typically for shorter distances.

Similarly, in metropolitan areas, fiber is generally not cost-effective unless rights-of-way are available at reasonable rates.¹¹ Even railroads and utilities may have trouble obtaining rights-of-way for communications facilities because the rights-of-way they already hold often are only for limited purposes (i.e.,

¹⁰ It is not clear from the NPRM that the Commission is proposing subsidizing all the costs associated with the relocation of incumbent licensees' 2 GHz facilities. Moreover, new 2 GHz licenses would not -- under the Commission's proposal -- be obligated to subsidize the costs for microwave licensees to relocate from new (i.e., secondary status) facilities or for added maintenance costs associated with operating at higher frequencies or with fiber optics.

¹¹ In urban areas, fiber optic implementation can cost as much as \$1 million per mile.

only for their railroad, gas, electric or water utility purposes, and not for communications). Thus, additional costs would be incurred for negotiating rights-of-way. Microwave, therefore, is more appropriate for a marketplace with relative small capacity and short-haul communications needs, as evidenced by the historical proliferation of Part 21 licenses obtained for such purposes.

* * * * *

The Commission has recognized that "private and common carrier fixed microwave services operating in [the 2 GHz band] provide important and essential services."¹² It would be arbitrary and capricious to take necessary and efficiently used spectrum away from the providers of these "essential services" -- leaving them with few viable alternatives to maintain the integrity and reliability of their communications networks -- in order to allocate spectrum to unproven, developing technologies. Rather, the Commission should seek alternative solutions to the emerging technologies spectrum problem without unnecessarily disturbing the well-settled microwave frequency allocations.

¹² NPRM at ¶ 19.

Finally, the Commission's proposal also contains a significant paradox. One of the heralded features of some of these "emerging technologies," such as personal communications systems ("PCS"), are their low costs. Nowhere, however, has the Commission sought to determine how these expected low costs would be affected if PCS licensees had to spend millions of dollars to pay for current 2 GHz licensees to relocate from their current frequencies. It is logical to expect that, notwithstanding their position today, some PCS licensees may claim "hardship" when the time comes to "ante up" to microwave licensees for relocating. If so, such entities would then likely seek significant reductions from reasonable subsidy levels. The microwave licensees would then have to pass the relocation expenses to the users of these essential services. One way or another, consumers of services the Commission deems essential -- either PCS users or current mobile service users, for instance -- would have to pay higher costs to obtain their services.

II. The Commission Should Study the Availability of Underutilized Government Spectrum and Frequencies Above 3 GHz Before Reallocating Heavily Used Commercial Spectrum.

The Commission concedes in the NPRM that it failed to determine the availability of government spectrum for emerging technologies because such spectrum is not under its jurisdiction.¹³ Given the attention being given in Congress and the Bush Administration to the reallocation of underutilized government spectrum for commercial use, the Commission should not so cavalierly dismiss the potential to use such spectrum for new technologies. Even if such available frequencies are insufficient to immediately solve the spectrum scarcity problem, they can at least substantially limit the amount of 2 GHz frequencies the Commission would have to reallocate. Indeed, as Congress has proposed, there is underutilized spectrum suitable for the development of emerging technologies currently allocated to government use which could be reallocated.¹⁴ It would be arbitrary and capricious for the Commission simply to reallocate all of the 2 GHz commercial microwave frequencies without inves-

¹³ NPRM at n.11.

¹⁴ S.218, H.R.531, 102d Cong., 1st Sess. (1991).

tigating the likelihood of obtaining some of this spectrum for reallocation.¹⁵

Indeed, efficient spectrum management requires that the Commission consider "the big picture." By artificially exempting some frequencies, certain bands will be underused, others will be over-crowded, and the most suitable spectrum may not be allocated to each service.

Similarly, the Commission should also examine the suitability of higher frequencies (i.e., above 3 GHz) for new technologies. The NPRM recognizes that experi-

¹⁵ See City of Brookings Municipal Telephone Co. v. F.C.C., 822 F.2d 1153, 1169 (D.C. Cir. 1987) (It is well settled that an agency has "a duty to consider responsible alternatives to its chosen policy and to give a reasoned explanation for its rejection of such alternatives") quoting, Farmers Union Central Exchange, Inc. v. FERC, 734 F.2d 1486, 1511 (D.C. Cir.), cert. denied, 469 U.S. 1034 (1984) (agency acted arbitrarily and capriciously by failing to consider proposed alternatives to the policy ultimately chosen and to provide a reasoned explanation for rejecting such alternatives). See also International Ladies Garment Workers' Union v. Donovan, 722 F.2d 795, 817 (D.C. Cir. 1983) (agency acted arbitrarily and capriciously where it decided to rescind a policy and failed to consider less far-reaching alternatives). This is particularly true given the press reports indicating a possible Congressional compromise over the bills pending in Congress that propose this reallocation. "Dingell Opens Door to Spectrum Use Compromise," Comm. Daily Vol. 12, No. 1 at 1 (April 24, 1992); "Congress Weighs in on PCS Spectrum," Telephony Vol. 222, No. 16 at 16 (April 20, 1992).

mental mobile use is currently taking place at these frequencies, but contends that the equipment for PCS-type services that are "expected to be" used will be designed for frequencies below 1 GHz.¹⁶ The Commission, however, has unquestionably put the PCS cart before the horse. Absent any prior demonstration of technical or cost limitations at higher frequencies, the Commission should allocate the most efficient spectrum and let equipment manufacturers design facilities accordingly. In any event, before the PCS testing is complete or at least further along, the Commission should not box new technology licensees into a corner of the spectrum that may not be the most viable or efficient corner.

In short, it would be much more effective to allocate higher, underutilized frequencies to new technologies, which can be developed specifically to account for the characteristics of such frequencies, than to move existing technologies to the higher frequencies where they may never be quite as reliable or efficient.

Finally, it is no longer clear that either emerging technologies or commercial microwave users will have to give up entirely on the 2 GHz band. At least

¹⁶ NPRM at ¶ 12 (emphasis added).

three entities recently completed tests or studies confirming that incumbent 2 GHz microwave licensees and future emerging technologies licensees could share at least a substantial portion of the frequency band, resulting in long-term peaceful coexistence. The Commission should further study the possibility of such shared use, or "co-habitation," prior to relocating current microwave users forcibly and unnecessarily.¹⁷

III. If the Commission Determines that Reallocation of the 2 GHz Microwave Band is Appropriate, It Should Take Steps to Ensure the Integrity of the Services Provided by Existing Spectrum Users.

If the Commission determines that present licensees in the 2 GHz band must be relocated, it should ensure that the respective replacement licensees compensate present users for the costs of relocation, including necessary equipment purchases and modifications and other related costs. The Commission must also ensure that the new frequencies for relocated microwave users, and the

¹⁷ See Telecommunications Reports Wireless News, "Pacific Proposes Integrated Narrowband PCS System to Share 1850-1990 MHz Band," at 10-11 (May 21, 1992); PCS News, "APC Completes Field Tests, Finds Frequency Sharing Feasible," at 1-2 (May 14, 1992); "Spectral Zone Coordination: Fast Track to PCN -- Solutions to Sharing 1850-1990 MHz," Impulse Telecommunications Corp. Strategic Insight Report (May 1992).

licensing rules governing operations on those frequencies, do not to reduce the quality of service currently provided. (As discussed above, other spectrum that is comparable to the 2 GHz band in terms of reliability may not be available regardless of any new equipment, reengineering, and network changes.) The Commission should also act as a forum to resolve disputes between current and new users to ensure that relocation costs are properly paid by new users.

In particular, if relocation is to occur, OCOM supports the proposal to compensate existing 2 GHz users for the costs of relocation through negotiated arrangements with the new licensee during a 15-year transition period.¹⁸ The Commission should adopt rules requiring new 2 GHz licensees and incumbent licensees to negotiate in good faith to determine reasonable relocation costs. These costs should include the expenses associated with replacing 2 GHz microwave equipment with alternative transmission means, such as purchasing fiber, if necessary, adding additional repeater paths to shorten path

¹⁸ OCOM has found that its 2 GHz microwave radios have a useful life of well beyond seven years. Accordingly, any transition period for existing users to convert to new frequencies should be 15 years, rather than 10 years. See NPRM at ¶ 24.

distances for higher frequency operations, and expenses for the professional services necessary to reengineer the network and obtain rights of way, zoning authority and other rights and authorizations necessary for relocation.¹⁹ Such rules are necessary or new licensees could force existing licensees to relocate or suffer interference when their licenses take on secondary status at the end of the transition period, particularly since parties displacing OCOM or other incumbent 2 GHz band licensees could be competitors of the incumbents and therefore have a disincentive to negotiate with them in good faith.

In addition, OCOM supports the proposal that current 2 GHz licensees be eligible for tax certificates for payments from new licensees to facilitate their relocation to higher frequencies (or other transmission media) since such payments would be in furtherance of a clear change in Commission policy.²⁰ It would be grossly unfair to force such licensees to relocate to new frequencies (or new transmission methods) and also to force

¹⁹ OCOM would concur that, prior to converting to fiber, other less expensive means should be examined.

²⁰ NPRM at n.17.

them to realize a taxable gain on a "sale" that simply enables them to relocate their operations as required. Alternatively, the new licensees would have to pay a premium over and above the 2 GHz licensees' cost of relocation so that the latter's tax liability -- a cost of relocation -- is covered.

The Commission has previously recognized that tax certificates may appropriately be awarded to common carrier radio licensees. See Telocator Network of America, 58 R.R.2d 1443 (1985). There, the Commission stated:

Our consideration of the legislative history and intent of Section 1071 [of the Internal Revenue Code] and existing Commission precedent, together with both the radical transformation of the telecommunications marketplace since the original adoption of the statutory language and the substantial policy considerations favoring the issuance of the certificates, lead us to conclude that the statutory phrase ["radio broadcasting"] should be given an expansive construction

Where the statutory language refers to "radio broadcasting," radio broadcasting represented the only context in which the Commission had applied its pro-competitive policies at the time of the section's enactment, and the section's legislative history is devoid of any intent to unduly circumscribe the Commission's authority to issue certificates in connection with the extension of its pro-competitive policies to other services.

For these same reasons, the Commission should extend its tax certificated policy to 2 GHz microwave